

# The Neighborhood and the Stream

## *Activity 10: Neighborhood Survey*

### **Goal**

- ❖ Locate activities occurring in the neighborhood that could cause degradation to the streams and rivers.
- ❖ Practice reading and using map.

### **Voluntary State Curriculum**

#### 1.0 Skill and Processes

- A Scientific Inquiry: 1, 6, 8, 9
- B Critical Thinking: 1, 4, 5

#### 6.0 Environmental Science

- C Natural Resources & Human Needs: 1
- D Environmental Issues: 1



**Time** 90 Minutes

### **Materials**

- ✓ Detailed street map of your targeted neighborhood
- ✓ Highlighted markers
- ✓ Clipboards
- ✓ Red felt-tip pens
- ✓ Neighborhood Survey Data Form

### **Motivation**

- ❖ Read “The Neighborhood and the Stream”
- ❖ Review “What to Look For: Potential Pollution Sources”

### **Procedure**

1. Decide how large an area of the watershed your group can cover in a walking survey. You can do a series of surveys if you want to cover more of the watershed. Also decide if you will divide into smaller groups, each with an adult chaperone.
2. Use highlighter to mark the route for your survey on the map.

### **Vocabulary**

**Commercial** – land filled with stores, malls and parking lots

**Industrial** – land that contains businesses that produce a product or provide a service for sale

**Institutional** – land with hospitals or government buildings

**Residential** – land with homes and yards

3. Review with the group what you will be looking for on the survey. Make sure students understand the connection between the potential pollution sources and the stream.
4. Provide each group with a clipboard, street map, red marker and data sheet.
5. Follow your mapped out route and identify potential pollution sources. Mark the location on the map and fill in the Neighborhood Survey Data Sheet.
6. When you have completed the survey, talk about what you found. Brainstorm ideas about how the group might take action to decrease pollution sources in the neighborhood.

### **Modifications**

- ❖ Work with a partner or in a team.

### **Assessment**

- ❖ Completed survey
- ❖ Participation

### **Optional Challenges/Extensions**

- ❖ Journal
- ❖ Project      Wet      Activity:  
                    What's Happening



# WHAT TO LOOK FOR:

## Potential Pollution Sources

Following is a list of land uses, human activities, and other features that may be potential pollution sources for the stream. These are the activities you will be looking for during the Neighborhood Survey.

### Developed Lands

Developed lands include any area of residential, commercial, industrial or institutional (hospitals, schools, government buildings, etc.) development.



Storm water runoff and sewage from developed areas pose the greatest threat to water quality.

Storm water runoff is the rainwater and other precipitation that flows over surfaces such as rooftops and roads. These areas are known as **impervious surfaces** because they do not absorb the water rushing over them. Rainwater runoff from these impervious surfaces contains high amounts of toxic metals, nutrients, and other pollutants. The sheer volume of runoff may cause flooding and severe channel erosion in waterways.

Directing runoff through grassy areas can slow its momentum and help filter out harmful pollutants. Look to see if the downspouts on the houses run onto the grass, onto sidewalks or driveways,

onto the street or directly into the ground.

Storm drains or swales may also serve residential neighborhoods in an effort to handle storm water. **Swales** are depressions or ditches that run between the residential property and the street; they should be filled with grass or other vegetation.

Swales are beneficial because they slow the erosive flow of storm water over land, reduce the volume of water rushing into a stream and help filter out pollutants.

### Storm Drains

If a storm drain system is present, you should find inlets with grates at most intersections. Water carried by storm drains does not go through a sewage treatment plant. Storm drains may carry rainwater runoff plus any mud, toxics or other pollutants directly into a nearby stream.



## Farmland

Not all farm land harms water quality. Cornfields and other croplands treated with a special environmental management method called **conservation tillage** may have little impact upon waterways. You can recognize the farmlands where this conservation method is used by the mat of dead vegetation blanketing the soil. To slow erosion, crops should be planted in rows running across hillsides rather than up and down.

## Construction Sites

Sediment runoff is the principal environmental offense associated with construction sites.

Sediment pollution is mud or soil on the move. Mud is a problem when it is carried from land into the streams. Sediment smothers bottom-dwelling plants and animals, clogs fish gills, and clouds the water preventing sunlight from reaching aquatic plants.



The barren soils of a construction site may erode and wash into nearby waters at a rate that is potentially harmful. Effective control of mud pollution at a construction site can be achieved through temporary stabilization. The two most common examples of temporary stabilization are straw mulching and grass seeding. Any unbuilt portion of a construction site that has been disturbed by bulldozers or other earth moving equipment and is not covered with

straw mulch or with grass is considered bare exposed soil.

## Sewage Station

A sewage pumping station is installed along sewer lines at any point where gravity alone is not sufficient to keep wastewater flowing to a treatment plant. Pumping stations also tend to be the most likely point where sewage may escape into the aquatic environment. Most pumping station buildings are constructed of red brick, with few, if any windows. The station is frequently enclosed with a fence and identified with a sign.

## Mining or Quarry Operations



The coal mines of western Maryland may be a source of mud pollution and acidic

water. The limestone and rock quarries of the central portion of the state, along with the sand and gravel operations of southern Maryland and the eastern shore may reduce stream flow as well as cause a mud pollution problem.

## Landfill

A landfill is the place where the trash from your home may end up. Most landfills are large pits, which may or may not be lined with a barrier of plastic or other material. As rainwater and soil moisture seep into the buried, decaying trash, a wide variety of pollutants are carried with it. If the

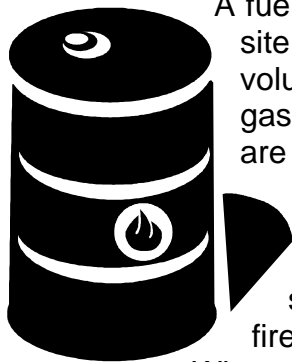
landfill is unlined the contaminated liquid, called **leachate**, will pollute nearby ground and surface water. Even lined landfills may pose a problem because the liners can leak.



## Overgrazed Pasture

A grass covered pasture will not generally threaten stream water quality as long as the turf is lush and thick. Overgrazed pastures will be subject to mud runoff and erosion.

## Fuel Storage



A fuel storage site is any site where large volumes of heating oil, gasoline, or other fuels are stored. Obvious examples are service stations, home heating oil suppliers and oil-fired power plants.

Wherever these fuels are stored, the potential exists for an accidental release into the environment. Fuels may then soak into the soil or be washed into a storm drain. Either way the pollution ends up in a stream, river and eventually in the Chesapeake Bay. Fuel oils are highly toxic to all aquatic plant and animal life.

## Auto Graveyard



An automobile graveyard may range from a site where a dozen cars lie rusting away to the resting places for

thousands of junkers. The potential water quality impacts are obvious; fuel and lubricants leaking from the engine and drive train, asbestos from brake linings, and toxic metals from the long-term disintegration of the vehicle itself.

## Livestock Area



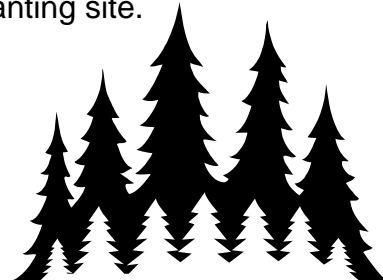
A livestock area may range from a dairy barn or barnyard

to an area where thousands of chickens or cattle are held and fed. If not properly handled, the wastes from livestock can severely pollute a waterway.

## Forested

Nothing is more effective in protecting water quality than trees. Trees filter out pollutants, slow down storm water flow, prevent erosion, reduce sediment runoff, and provide wildlife habitat.

Look for areas that may be a suitable tree-planting site.



# The Neighborhood and the Stream



Is your neighborhood close to or far from a stream? No matter what the distance, what happens in your neighborhood can make a difference in your local stream.

How developed is the land? How much is filled with stores and malls and parking lots (commercial)? How much has industrial plants or large hospitals or government buildings (industrial/institutional)? How much is used for houses and yards (residential)? How much is farmland?

The more developed the land is, the more storm water **runoff** there will be. Buildings, roads, sidewalks, and parking lots are all hard surfaces; they do not absorb water. Instead the water runs off quickly carrying toxic metals, chemicals, and other pollutants.

Areas with houses and lawns also cause problems. Rainwater often runs off roofs and out gutters right onto hard driveways or sidewalks. If gutters are aimed at grass instead, more water will be absorbed instead of running off. Lawns that are mowed close to the ground may look neat, but they don't absorb water very well. Keeping the grass at least 2 ½ inches tall makes the lawn a much better buffer. Trees and shrubs planted in the yard help even more. If a yard runs right up to a stream, it is very important not to

mow right up to the stream; tall plants, shrubs and trees will help the stream.

Construction sites can be harmful to a stream if soil is allowed to stand exposed to rain and wind. There are laws to prevent soil from washing away and polluting streams.

Farmland can be a source of pollution and soil erosion. Too many livestock can pollute a stream unless the wastes are properly handled. Fertilizers and pesticides contain substances that are toxic to the stream. Plowed land can lead to soil erosion.

Other possible polluters to look out for are: sewage pumping stations, mining and quarry sites, landfills, fuel storage sites, automobile graveyards, and logging operations.

In every kind of area, from highly developed to farmland, there are places where planting trees can help the stream. Identifying places for tree planting in neighborhoods is a great way to improve your local stream.

By understanding how activities in your neighborhood affect your stream, you can spot the problem areas. You can also help come up with ways to improve your neighborhood and your stream.



# Neighborhood Survey

## WHAT YOU WILL NEED

- ☐ Street map with survey route
- ☐ Clipboard
- ☐ Red felt-tip marker
- ☐ Stream Sampling Kit
- ☐ Neighborhood Survey

When you have completed your route, talk about what you found. How is your neighborhood affecting the stream? What are some ways you might help reduce pollution from your neighborhood?

## AT HOME...

## WHAT TO DO

Talk about what you will look for on your survey. Review the route you will walk. Agree on the safety rules you will need to follow.

Look at your own home and yard. Are there ways you could help decrease runoff and pollution? Talk with your family about what you have learned and what you might do at home.

As you walk the route, look for all potential pollution sources. Note whether a particular block is residential, commercial, industrial/institutional, farmland or forested. Use the red marker to put a number on the map for each location you want to note for certain potential problems. Make notes about anything else you see that might affect your stream.



Student Page

# Neighborhood Survey

Write the number of each location you mark on your map on the checklist below.  
Check all boxes that describe what you see at each location.

Location #\_\_\_\_\_

Major Land Use:    ☐ Residential        ☐ Commercial        ☐ Farmland  
                         ☐ Institutional/Industrial        ☐ Forested

Potential Pollution Sources:

<input type="checkbox"/> Storm Drains	<input type="checkbox"/> Construction Site	<input type="checkbox"/> Crop Fields
<input type="checkbox"/> Sewage Station	<input type="checkbox"/> Landfill	<input type="checkbox"/> Overgrazed Pasture
<input type="checkbox"/> Mining or Quarry	<input type="checkbox"/> Fuel Storage	<input type="checkbox"/> Auto Graveyard
<input type="checkbox"/> Livestock Area	<input type="checkbox"/> Gullies or Eroded Soil	
<input type="checkbox"/> Downspouts – empty to:		
<input type="checkbox"/> Grass	<input type="checkbox"/> Driveway	
<input type="checkbox"/> Sidewalk	<input type="checkbox"/> Underground	

Other things that might affect the stream:

---

Location #\_\_\_\_\_

Major Land Use:    ☐ Residential        ☐ Commercial        ☐ Farmland  
                         ☐ Institutional/Industrial        ☐ Forested

Potential Pollution Sources:

<input type="checkbox"/> Storm Drains	<input type="checkbox"/> Construction Site	<input type="checkbox"/> Crop Fields
<input type="checkbox"/> Sewage Station	<input type="checkbox"/> Landfill	<input type="checkbox"/> Overgrazed Pasture
<input type="checkbox"/> Mining or Quarry	<input type="checkbox"/> Fuel Storage	<input type="checkbox"/> Auto Graveyard
<input type="checkbox"/> Livestock Area	<input type="checkbox"/> Gullies or Eroded Soil	
<input type="checkbox"/> Downspouts – empty to:		
<input type="checkbox"/> Grass	<input type="checkbox"/> Driveway	
<input type="checkbox"/> Sidewalk	<input type="checkbox"/> Underground	

Other things that might affect the stream: